Zero Retries issue 0119 2023-10-06

Zero Retries is an independent newsletter promoting technological innovation in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication, with 900+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Web version of this issue - https://www.zeroretries.org/p/zero-retries-0119

Request To Send

Editorial by Steve Stroh N8GNJ

New Paid Subscriber

My thanks to new Paid Subscriber “Prefers to Remain Anonymous 13” for their financial support of Zero Retries. Financial support is a real vote of confidence for continuing to publish Zero Retries.

October!

Not that it has any bearing on Amateur Radio, but it’s October, my favorite month and time of the year. Growing up in Ohio, October was almost always warm sunny days and crisp clear nights, with just the right amount of leaf color and loose foliage.

Here in the Pacific North*wet*, these last few beautiful sunny days in October are a reminder to finish any lingering outdoor projects, such as the “expedient” installation of my Starlink terminal (see below) before the monsoons commence, as well as a few last chances to see our local Mount Baker before she gets her all-winter-long covering of clouds.

Progress on Zero Retries Interesting RSS Feeds

This task is ongoing - I will post a list of Zero Retries Interesting RSS feeds soon.

Progress on ARRL Leadership Email Campaign - Symbol Limitations for VHF / UHF

No progress on sending these emails yet.

Zero Retries > 1000 Subscriber Goal

I have a modest goal to get the subscribed reader count for Zero Retries > 1000 by the end of 2023. Please let your co-conspirators in Technological Innovation in Amateur Radio know about Zero Retries and encourage them to subscribe. Zero Retries remains free, as in beer to read and subscribe.

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N8GNJ Labs Now Online Via Starlink

By Steve Stroh N8GNJ

After experimenting with Starlink for much of 2023, the wet and cold season is fast approaching here in Whatcom County (Bellingham) Washington, and it was time to do at least an "expedient" installation of Starlink so I could use it full time in N8GNJ Labs.

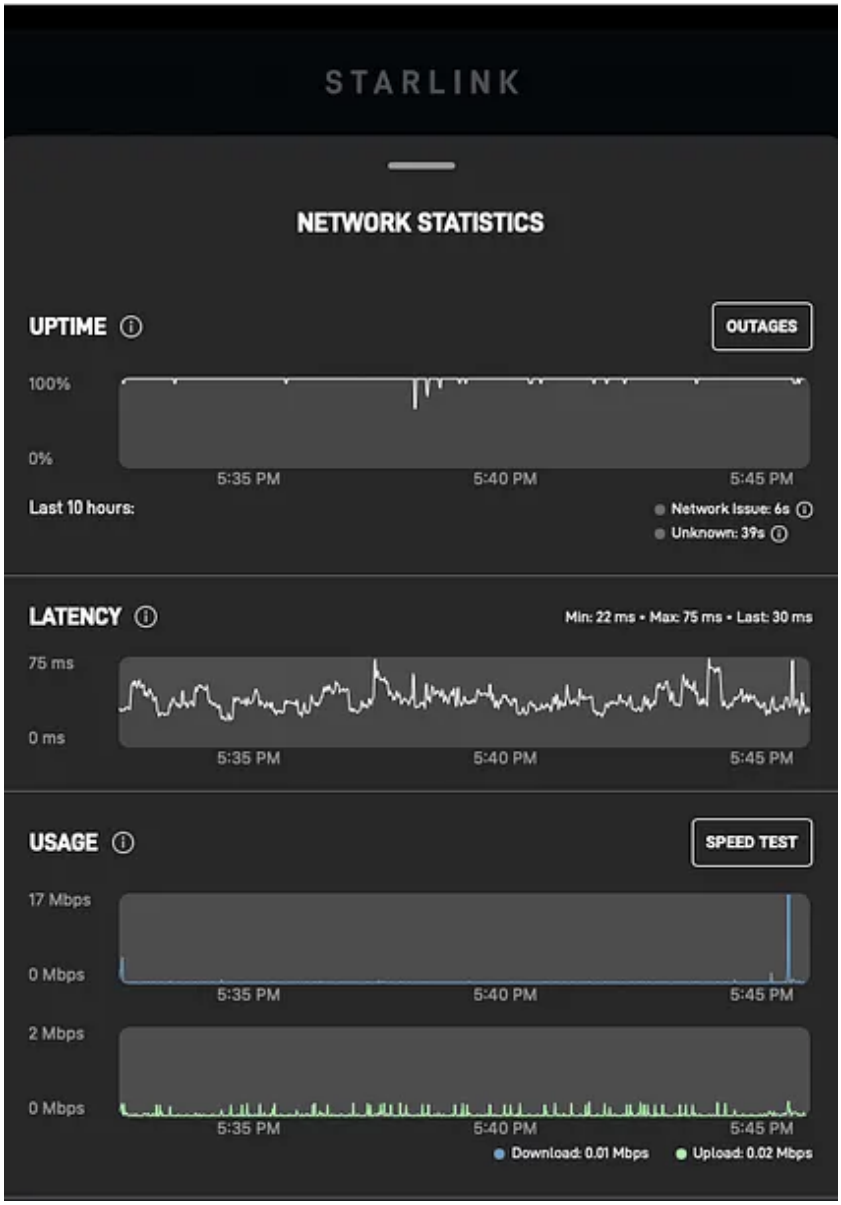
N8GNJ Labs “Expedient” Starlink Installation - 2023-10-01

N8GNJ Labs (where my office is located) is now online solely via Starlink Low Earth Orbit (LEO) broadband Internet. The performance is acceptable with very minimal outages (45 seconds over 10 hours) and variable, but acceptable speeds. Over the months since I bought Starlink, I’ve had Starlink online sporadically, but only “throw it in the yard and try it out for a while” testing. For the coming winter season, I decided to do what I’m calling an “expedient” installation — not exactly permanent, but good enough, and good enough performance that doesn’t require being on a ladder and tall pole. Thus I can defer the permanent installation on the roof or a pole, to provide “Dishy”1 a clear sky view, until Spring. This winter I hope to queue up a number of antenna installations — obtain all parts, etc., and do several antenna installations, including Dishy with the use of a scissor lift, in Spring 2024.

If all goes well, I can abandon Comcast Internet service… because… well, it’s *Comcast*.

It’s remarkable to me how *plug and play* Starlink is:

- Pull everything out of the box,
- A bit of minor mechanical assembly,
- Connect the cables,
- Place Dishy so that it can see the sky,
- Apply power to the router,
- Do a bit of configuration (name, password) in the phone app,
- *And… done*! Online (via Wi-Fi) at broadband Internet speeds.



N8GNJ Labs Starlink quick stats - Last 10 hours 2023-10-02

The system (perhaps aided a bit by the app and the phone's Internet connection) mostly figures things out by itself, including optimum aiming of Dishy. Dishy will do a rough alignment and then "learns" about its environment (signal blocking obstructions around it) and eventually aligns itself for the the azimuth and elevation that provides optimum access to the most Starlink satellites. In my case, after several days of operation, Dishy determined that there was an obstruction (the steel wall of N8GNJ Labs) to the East / Northeast and because of that obstruction, I could expect a service interruption every 12-13 minutes. In practice, the service interruptions are on the order of 15 seconds over the course of 12 hours.

Admittedly the broadband Internet performance isn't stellar; after several days of Dishy optimizing itself, a typical speed test was 83 Mbps download and 18 Mbps upload. Such speeds are certainly not competitive with fiber[2] or even cable Internet, but it works well enough for my needs here in N8GNJ Labs and the performance will likely improve over time with more (and more sophisticated) Starlink satellites, software updates, and eventual permanent installation up high with a better view of the sky.

With Starlink…

- No waiting on installers,
- No visit to a store and dealing with bored / harried / poorly trained personnel,
- No discussing or messaging with an overseas call center,
- Nearly full transparency of the status of the system / connection via the app and an internal web page on the router…
- Starlink is a truly a *modern* Internet solution with few compromises. It's especially suitable for rural areas whose only previous options have been (poor) GEO satellite, (poor) cellular, and (poor) DSL.

But, Starlink *isn't* for everyone. Before I did the "expedient" install, I threw everything into our minivan and took it to the house of an acquaintance whose

current Internet is via a Geostationary Earth Orbit (GEO) satellite system. Their complaint was that they would like to watch streaming content but it only takes a few days per month to exceed the monthly transfer cap of the provider, and then their Internet access slows down drastically (but doesn't completely stop, thus barely maintaining the illusion of "unlimited" Internet). They were hoping Starlink would work better than their existing GEO satellite Internet, and asked if I could demo Starlink at their house. Unfortunately their house's lot was ringed with tall trees and Dishy had a very limited view of the sky, and unlike my experience at N8GNJ Labs, there were *many* service interruptions. Thus my enthusiasm for Starlink as an emergency broadband Internet system is tempered a bit, but I still believe it's a better emergency communications system than cellular (requires local infrastructure be intact) or GEO satellite (expensive equipment, requires line of sight to a *specific* spot in the sky for the GEO satellite).

One minor "to do" item remaining for the expedient installation is to install some "ballast bags" (normally used for shade umbrellas) that will help keep Dishy upright during the amazing winds we have in this area. They're on their way from Amazon.

I'll report my longer term impressions of Starlink here in Zero Retries over the coming months.

As for Amateur Radio use of Starlink, here are a couple of excellent presentations about using Starlink with Amateur Radio:

- Starlink, AREDN, and Networking by Tom McDermott N5EG
- Ham Radio over Starlink - Radio waves via IP via Satellite! by Josh Proehl AI7JP

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MMDVM Project Update

By Steve Stroh N8GNJ

Remarkable progress is underway to improve software for the Multi Mode Digital Voice Modem (MMDVM), and I imagine the possibilities resulting from these new capabilities.

A recent joint press release by ARDC and MMDVM Project3 revealed several new details about the activity underway to markedly improve and add startling new capabilities to MMDVM software - beyond what was described in a previous article in Zero Retries - MMDVM-TNC Project - New 9600 bps Data Mode. For example:

> Work is currently underway to develop 9600, 19200, and 38400 baud packet modes that support narrow bandwidth using a modulation (4FSK) similar to Digital Mobile Radio (DMR). The packet modes include support for IL2P, which is a new link layer protocol with integral forward error correction (FEC).

38.4 kbps! In a 12.5 kHz channel (as previously discussed). *That speed doesn't just match the speed of VARA FM (25 kbps in a 20 or 25 kHz channel), but exceeds it!*

There was also this:

> Adding support for industry standards, such as Message Queuing Telemetry Transport (MQTT), which is analogous to a fast and reliable texting system that allows devices to communicate efficiently.

From the press release (and my general unfamiliarity with MQTT), it's not clear to me how MQTT would be used in the context of Amateur Radio and MMDVM. The Wikipedia article and mqtt.org didn't clear things up, but I *think* that adding MQTT to MMDVM software is, essentially, a standardized way to exchange bits / packets between a MMDVM unit and applications for MMDVM.

Speculation - MMDVM Repeaters

To build on my previous article in Zero Retires 0113 - Commentary on the MMDVM-TNC Project, I see amazing potential for rebuilding existing repeaters, and likely new repeaters with MMDVM as a core:

> **"MMDVM-REPEATER"?**
> I'm on record as one of the few who have participated in the community effect of data-only full-duplex repeater systems. My experiences were now nearly three decades ago and while the 9600 bps FSK systems of that era worked acceptably (the bit regeneration between the repeater's receiver and transmitter helped a lot), with current technology we can do better now.
>
> We're now seeing MMDVM being used as the core of repeaters - typically used for various digital voice modes. Now with the option of MMDVM-TNC running on MMDVM hardware, the same techniques for building digital voice repeaters based on MMDVM units can now be used to construct data-only repeaters. At least it's *my* hope that MMDVM-TNC will evolve to include repeaters and not be limited for use only for local simplex operations or point-to-point links.

I won't be so ignorant and arrogant to say that doing so is *easy*… but it now seems clear that MMDVM can be refitted to almost any repeater that has input / output for external audio processing, which is most modern repeaters. I've been on a long quest to see *data* repeaters in Amateur Radio *re-emerge*, and MMDVM makes that possible.

While "data" has been "possible" on a number of Amateur Radio repeater systems, it's been severely limited in practice:

- While 1200 bps Audio Frequency Shift Keying (AFSK) can use any voice repeater, it is annoying to listen to on a voice repeater, so there is very little "sharing" of 1200 bps AFSK and analog voice in effect.
- 9600 bps Frequency Shift Keying (FSK) required a bit regeneration controller between the receiver and transmitter for acceptable performance… thus there are few, or none of them now, especially now that the TAPR 9600 bps modem bit regen board is a footnote of history.
- D-Star modulation is 4800 bps in 6.25 kHz. D-Star does have an integral data capability, including D-Star repeater usage, it has not been

implemented very well (my perception is) that it's not widely used. The "late in the game" emergence of the D-Star "DV Fast Data" mode is also not widely used.

- Digital Mobile Radio (DMR) modulation is 4800 bps in 12.5 kHz. DMR does have a data capability outlined in the DMR specification, including DMR repeater usage, but other than proprietary implementations by Motorola and Hytera, I haven't found any widespread use of data via DMR.
- System Fusion (SF) modulation is 4800 or 9600 bps in 12.5 kHz. SF does have a data capability, including SF repeater usage, but it's "hard coded" to only transmit photos. Data on System Fusion was a (deliberately) squandered opportunity.

Thus, my perspective is that D-Star, DMR, and SF will all remain dedicated Digital Voice (DV) systems, with minimal-to-none data capabilities (but are supported by MMDVM).

But an **MMDVM Repeater** enables exciting new possibilities:

- Legacy FM for maximum compatibility with every VHF / UHF radio, including compatibility with VARA FM via repeater.
- M17 Project is an emerging Digital Voice standard created in the 21st century that still has potential to implement a data capability on par with Digital Voice.
- POCSAG is a robust, but limited data transmission standard developed for pagers. Imagine building simple POCSAG receivers based on Software Defined Receiver dongles for reception of bulletins transmitted by a local repeater. There's even an entire project and network in Europe called DAPNET to make use of paging technology.
- The new data mode called MMDVM-TNC which offers speeds of 9.6 kbps, 19.2 kbps, and (per the press release) even 38.4 kbps, all with *integral* Forward Error Correction (FEC). We've seen how well integral FEC works for Digital Voice and now we're finally going to see how well integral FEC will work for Amateur Radio data communications.
- And all of the above can, at least theoretically, coexist on the same repeater. In some discussions I've had about this possibility, I was told that the processors in existing MMDVM hardware just aren't up to *simultaneously* decoding multiple modes; that wasn't the design goal back when MMDVM was conceived. The intent with MMDVM was maximum flexibility - choose any of the Digital Voice standards and not be locked into one such as buying a DMR (and FM) radio, or D-Star (and FM) radio, or SF (and FM) radio.

It's my guess that the 38.4 kbps data modem capability, along with the integral FEC, will… if not *require*… will "work optimally" on a newer, more powerful generation of processors in a new generation of MMDVM hardware that's justified by these new capabilities. I think that's hinted at by this line in the press release:

> Porting firmware to next generation microcontrollers

Per my discussions (and my understanding from those discussions), the ability to mix and match multiple modes (simultaneous decoders) on an MMDVM repeater will *only* be possible with a newer, more powerful generation of processors in a new generation of MMDVM hardware. Fortunately, more capable embedded processors are increasingly affordable (and available).

Tying together some of the disparate *public* statements about MMDVM improvements this year further supports my speculation that more powerful MMDVM hardware may be forthcoming to support these new MMDVM capabilities:

- The $150,000 ARDC grant that is enabling this work went to ZUM Radio, a company that manufactures MMDVM products. Thus ZUM Radio is in a "tight feedback loop" with the development of new capabilities for MMDVM.4
- Upon receiving the ARDC grant, ZUM then (per the press release) hired Jonathan Naylor G4KLX5 to do the software development outlined in the ARDC grant. G4KLX is the primary developer of the MMDVM technology.
- ZUM Radio has a history of periodic hardware upgrades to provide enhanced capabilities in its products.
- One of the stated goals of the ARDC grant, in addition to the new software capabilities was "Porting firmware to next generation microcontrollers".

Thus, with all of the above, I expect it will be an interesting 2024 for the evolution of data communications in Amateur Radio as a result of the new capabilities (**38.4 kbps** - *Woo Hoo!*) enabled by G4KLX's new software development for MMDVM, and potentially, new and more capable MMDVM hardware, *including MMDVM Repeaters*.

Hint for those that want to put new repeaters online that will be based around an MMDVM - *just check the box that says **FM***. That's close enough to the truth (your new repeater *will* do FM), and thus won't cause a kerfuffle in the repeater coordination group about heathen data operation in the "**voice** repeater bands". Trying to explain that yes, repeaters can be used for data, is just asking for a bag of hurt with the average repeater coordination group. Anyway, that's *my* plan.

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Zero Retries Interesting YouTube Videos - September 2023

By Steve Stroh N8GNJ

These are some of the YouTube videos that I found Zero Retries Interesting in the past month. This list does not include videos already mentioned in 2023-09 issues of Zero Retries. No, I haven't watched all of these, especially all the way through. Yet.

In future installments, I'll include a one line or so descriptor of what, specifically, I found to be Zero Retries Interesting in each video. For this initial installment, the title will have to suffice.

- **Andreas Spiess** - Rutgers University Confirmed: Meshtastic and LoRa are dangerous

- **andy kirby** - KNOW THIS ABOUT THE FLIPPER ZERO...
- **Budd Churchward** - 09-19-23 MBARC Digital Club Meeting
- **element14 presents** - Simplify Network Monitoring: Building an ESP32-powered Solution
- **GNU Radio** - GRCon23 Thursday - Kevin McQuiggin - Amateur Radio, DSP and GNU Radio
- **GNU Radio** - GRCon23 Friday - Dennis Rosenauer - Design of a 1296 MHz SDR Radio System for EME
- **HAM RADIO SCANNER - HOBBY DIARY M0FXB** - SDR ++ FREE SOFTWARE , SDR DONGLES
- **HB9BLA Wireless** - New: Comfortable and robust VOIP without PBX in AREDN networks
- **KM4ACK** - VarAC on Linux Mint 21 1
- **KM6LYW Radio** - Radio Texting the Easy Way!
- **saveitforparts** - I Bought A Geodesic Space Dome!
- **saveitforparts** - Testing Antennas For GOES Geostationary Weather Satellite
- **Ria's Ham Shack** - Talking EU HAMNET with Jann DG8NGN
- **Skip Macaulay, VE6BGT** - The 10 Ghz Experiment Part 6
- **Tech Minds** - DigiRig Mobile - Combines Audio Codec With Serial CAT And PTT
- **Tech Minds** - Lilygo T-TWR Plus Rev 2.0 - ESP32S3 With Onboard SA868 Radio Module - Walkie Talkie
- **Tech Minds** - Module17 Standalone M17 Radio Modem For Ham Radio
- **Tech Minds** - OpenWebRX Plus - The ULTIMATE Web SDR Application
- **Temporarily Offline Ham Radio** - I Mean 100 Amp Battery... right?

Suggestions welcome! What did I miss?

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Hot Iron Newsletter

I was delighted to discover the Hot Iron Newsletter (subtitled **Journal of the Constructor's Club**) from this mention on Amateur Radio Daily:

> **Hot Iron Newsletter for Amateur Radio Operators**
>
> October 2, 2023
>
> Frank (W4NPN) along with Peter (G6NGR) produce the quarterly amateur radio newsletter Hot Iron. Each issue is full of technical projects and commentary from antennas to transmitters to power supplies.
>
> Going on 10+ years, each newsletter is available in PDF format.

I was about to say that Hot Iron follows the ethos of Zero Retries and other "publish in public" Amateur Radio publications, but given its much longer history, it's more accurate to say Zero Retries *follows in the ethos of Hot Iron*. Hot Iron is a very readable, practical, Zero Retries Interesting newsletter with 121 issues to date. I've corresponded briefly with Frank Barnes W4NPN, one of the principals of Hot Iron, after I subscribed, and W4NPN is now a Zero Retries subscriber.

All issues of Hot Iron have been mirrored on Digital Library of Amateur Radio & Communications (DLARC) on the Internet Archive. A minor improvement of the issues on DLARC is that the earlier issues of Hot Iron (that are image-only PDFs on the Hot Iron website) were OCR'ed on DLARC, which enables cutting and pasting text from those earlier issues.

Hot Iron took a different tact with the Hot Iron Searchable Compilation:

> The more than 121 issues of Hot Iron contain information about dozens of topics. It can be difficult to find all entries about a single subject, scattered across all issues.
>
> To overcome this difficulty, K4ZAD has done a great service by compiling all issues into four searchable .pdf documents using OCR technology. If scanned into a single .pdf, the resulting 90-100 mb file might have overwhelmed many browsers so breaking it into four files solves that problem. These compilations will make topic searches vastly easier and faster!

The entire Hot Iron collection is in my queue for reading - *recommended!*

ARDC is Recruiting Volunteers for 2024 Committees

> The deadline for applying for these positions is October 31, 2023.
>
> ARDC is now accepting applications from individuals interested in serving on our committees in 2024.
>
> - Grants Advisory Committee (GAC) – reviews grant applications
> - Technical Advisory Committee (TAC) – works on 44Net-related projects and policies
> - Conduct Review Committee (CRC) – helps to evaluate Code of Conduct incident reports
> - NEW for 2024: Grants Evaluation Team (GET) – evaluates and analyzes grant reports

My experience from two years on the GAC is that these positions are not for dilettantes; at times, my hours spent on GAC work approached that of a part-time job. Thus, be advised that *volunteering for an ARDC committee is a commitment*… but well, *well* worth the effort on behalf of Amateur Radio. If accepted, you'll be proud of the work you'll do, as I am (1, 2, 3, 4, 5, 6 among *many* funded grants).

I'm really glad to see ARDC's intent to form a **Grants Evaluation Team (GET)**; reporting out *substantively* (not just vignettes) on the success (or failure) of ARDC grantst is a badly missing element in ARDC's grantmaking. It bodes well for such an effort that ARDC was recruiting for a (paid) Grants Associate to help with this work.

DSpectrumGUI

> The goal of this app is to make it trivial to demodulate common RF signals, and provide a digital worksheet for your reverse engineering efforts.
>
> - Community can trivially donate reverse engineering worksheet templates
> - Users can trivially import donated reverse engineering worksheet templates
> - Ability to store device metadata and transmission binary
> - Wraps Inspectrum and uses its "Extract Symbols" feature to help convert pulses into raw binary
> - Automatic analysis of the binary to determine the modulation and encoding types (see Supported modulation types)

Interesting project! Unfortunately, it doesn't seem to be an active, maintained project, but there was a v1.0.0 (stable) release.

BB-6 Goes To Antarctica

> The first build of the [Turn Island Systems] Beacon Blaster 6 [BB-6] transmitters is being deployed, and I am very excited to announce that one of these is on the way to the remote **Neumayer Station III** in Antarctica.
>
> Some of the researchers there are radio amateurs and have been operating from this remote location using WSPR and other modes. The BB-6 will provide FST4W capability, and the frequency stability and "spreading" resolution of this mode (and this polar location) will greatly enhance the ability to study ionospheric propagation. Neumayer Station III operates under the callsign **DP0GVN**.

It's pretty cool that an Amateur Radio system such as the BB-6 that was designed and built here in the Pacific Northwest, just a few miles from Bellingham, is being deployed to *Antarctica!*

Also, the User's Guide and Specifications manual of the BB-6 is *extremely well-written*. As someone who's done such technical writing, with considerable care and detail, about obscure, deeply technical products in the past, I have some standing to make that assessment.

---

node-pop3bbs

> Here is a simple BBS backed by standard POP and SMTP email servers. This could be useful in an intranet, for example an AREDN network. If there are standard email servers in the intranet, this BBS enables users to access them via VARA and/or AX.25 packet radio. BBS users can exchange email with other users of the mail servers, who may use email clients like Microsoft Mail or Outlook.
>
> Outpost works with this BBS. Users connect to the BBS via AX.25 or VARA. The user interface is a small subset ofJNOS version 2. Unlike JNOS, this BBS uses a POP server to download messages, an SMTP server to send messages, an LDAP server to identify users, an AGWPE-compatible server to handle AX.25 connections and a VARA-compatible TNC to handle VARA connections.

It's cool to see projects like this that use Internet standards to knit together disparate Amateur Radio data systems such as AREDN and VARA. "Back in the day" of the Puget Sound Amateur Radio TCP/IP Network, such interoperability was on the horizon (we had basic POP and SMTP services), and there was some of this interoperability in JNOS, but I at least never got to the point of using standard email apps like Eudora (now I'm *really* dating myself) for Amateur Radio email. Back then, we used a mail app called "Bdale's Mailer" that's now so obscure that there are *very* few references to it online.

WINTNC v2.04

From Facebook **Packet radio systems and information**, 2023-09-20 by Jon Welch G7JJF:

> I have now released Ver 2.04 of WINTNC with several new features and enhancements. I have also removed the registration requirements so anyone is free to use all the features of the program without needing to request a registration key from myself. Please download a copy from https://www.g7jjf.com/wtnc204.htm and feedback any issues you find. I am also trying to put together an FAQ at https://www.g7jjf.com/tncsetup.htm on how to configure the various TNC's out there to work with WINTNC. I would be grateful for any feedback you can give on how you configured your TNC to work in KISS mode with WINTNC.

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Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- ***Founding Members* who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT
  Founding Member 0001 - Prefers to Remain Anonymous 01

  Founding Member 0002 - Chris Osburn KD7DVD
  Founding Member 0003 - Don Rotolo N2IRZ
  Founding Member 0004 - William Arcand W1WRA
  Founding Member 0005 - Ben Kuhn KU0HN
  Founding Member 0006 - Todd Willey KQ4FID
  Founding Member 0007 - Merik Karman VK2MKZ
- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org
- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
  Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- Jeff Davis KE9V also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.
- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!
- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.
- TAPR Packet Status Register has been published continuously since 1982.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA
- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)
- Modern Ham by Billy Penley KN4MKB
- Tech Minds by Matthew Miller M0DQW

Zero Retries is currently using the Substack email publishing platform to publish Zero Retries. It's particularly suitable for small newsletters as you can get started for no cost.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ~~100~~ ~~200~~ ~~300~~ ~~400~~ *500* ~~600~~ ~~700~~ ~~800~~ *900+* other subscribers:

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If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA. As of October 2023, Zero Retries is generally composed via **Starlink *Satellite* Internet Access** (which *is* pretty cool).

2023-10-06

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Blanket permission granted for TAPR to use any Steve Stroh content for the TAPR Packet Status Register (PSR) newsletter (I *owe* them from *way* back).

1

"Dishy McFlatface" is the product name for the Starlink user terminal (the antenna). Dishy includes both rotational and attitudinal motors… but rarely uses them after initial orientation.

2

Besides Starlink, my "broadband" Internet options in this area are (in order of usability), cable modem, Wireless ISP (though they don't offer coverage to my neighborhood), "home" cellular service, DSL (the inheritor of the copper telephone network humorously uses "Fiber" in their brand name), and GEO satellite. No hint of fiber deployment to my neighborhood in *this* decade.

3

The MMDVM Project's website is very basic at this moment. The URL redirects to what seems to be a free hosting site, and most of the links on the site don't work. It doesn't even have the press release posted (for which it's supposedly a partner in the announcement).

4

All of the MMDVM work supported by the ARDC grant *is open source*, being developed "in the open" on GitHub. Thus that work *is accessible to other hardware vendors and software developers*. I'm only speculating the ZUM Radio will benefit from this work because *they're in a position to pay close attention to that open source development*. Not to mention that, *eventually*, G4KLX will have to test this new software and the MMDVM-TNC modes on some actual MMDVM hardware… perhaps some with "*next generation microcontrollers*". Just sayin'.

5

This was *new* public information in this press release; the information released by ARDC about the grant merely stated "… hire a full-time software engineer onto the MMDVM project team".